
Duration in and Pattern of Utilization Under Children's Health Insurance Programs

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This article provides information on duration of enrollment and utilization under children's health insurance programs for States planning to expand such programs in response to the Balanced Budget Act of 1997. Using data from children's health insurance programs in Pennsylvania, we find that there is a significant turnover among enrollees and the pattern of use following enrollment suggests considerable pent-up demand for medical services. The annual payment per child for services with a comprehensive benefit package in 1994-95 was estimated to range from \$500 to \$600 depending on turnover, which is a slight underestimation because some hospitalized children were shifted to Medicaid.

INTRODUCTION

Access to health insurance for children has become a central policy issue. In recent years the number of American children without health insurance increased partly because an increasing number of employers dropped health insurance coverage for dependents or because they raised the employee's share of premiums leading them to drop dependent coverage (Berman, 1995). By 1996, 10.5 million children, or about 15 percent of all children, were uninsured (Salganicoff, Keenan, and Liska, 1998).

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In response, some States and the Federal government began to implement policies to extend health insurance to children. The most ambitious of these was the implementation of the State Children's Health Insurance Program (CHIP) in the Balanced Budget Act of 1997. Under this legislation, the Federal government allocated \$20.3 billion in Federal matching funds over 5 years to States to expand health insurance to children who would otherwise be uninsured (Kaiser Family Foundation, 1997). The law gives the States considerable flexibility in how to insure children. They can expand their current Medicaid programs, establish new children's health insurance programs, or combine the two approaches. CHIP targets low-income children whose family incomes are no more than 200 percent of Federal poverty level (FPL) or 150 percent of a State's Medicaid income-eligibility level, whichever is higher (Rosenbaum et al., 1998).

Since the passage of the legislation, States have begun to plan and implement expanded health insurance coverage for children. However, insurers and policy-makers are concerned that previously uninsured people will have high rates of utilization because they may have pent-up demand for health care (Freeman et al., 1990; Hoare, Madden, and Mayers, 1992; Martin et al., 1997). They need information about the magnitude of the use of services under the different programs. They also need to have some information about how long children can be expected to remain in this program.

We looked at these issues using data from children's health insurance programs that were implemented in Western Pennsylvania. We examined the enrollment pattern of children who were enrolled in these programs between July 1993 and June 1995. We used a proportional hazards model to analyze the relationship between characteristics of the enrollees and their families to the length of time the children stay on the program. In addition, we examined the time path of utilization of different services. We used this information to compare the average annual payment of a program for covering children who are continuously enrolled for a 12-month time period with the annual payment of a program that enrolls children over the course of a year.

HEALTH INSURANCE PROGRAMS

The CHIP (BlueCHIP in Western Pennsylvania) and Caring Programs were designed to provide health insurance coverage for uninsured children.¹ Figure 1, which presents the eligibility criteria for these programs, shows how the eligibility varied by age and family income. The programs provided the same comprehensive benefits package including preventive care, doctor office visits when a child is sick, outpatient diagnostic tests, emergency medical and accidental care, outpatient surgery, prescription drugs (\$5 copay per prescription), dental care, vision care,

¹ The source of funding for the two programs varies. The Children's Health Insurance Program is a statewide program funded by a State cigarette tax. It is administered in Western Pennsylvania by the Western Pennsylvania Caring Foundation for Children, part of Highmark Blue Cross, and is called BlueCHIP. Caring, which is also administered by the Western Pennsylvania Caring Foundation for Children, is financed by community funds with matching funds from Highmark which also donates the administrative costs. Neither program is an entitlement program, and the number of children covered is dependent on available funds. The programs cover children who live in the 29 counties that make up Western Pennsylvania, an area that includes 4.1 million people. Under the State CHIP, the CHIP program will be expanded and the Caring programs will be terminated.

hearing care, inpatient hospitalization, and mental health. The programs were considered to be complimentary since children in the same family, regardless of age, would be enrolled in the same health plans (although the funding sources might vary). As shown in Figure 1, the children in families with incomes below 185 percent of the FPL were eligible for the free programs, while those in families with incomes between 185-235 percent of the FPL were eligible for low-cost programs.² Monthly premiums for the low-cost programs were \$20 for one child, \$40 for two children, and \$50 for three or more children per family. (These insurance programs were linked to the Medicaid program because expenditures for hospital care count towards whether the family will spend down to Medicaid.)

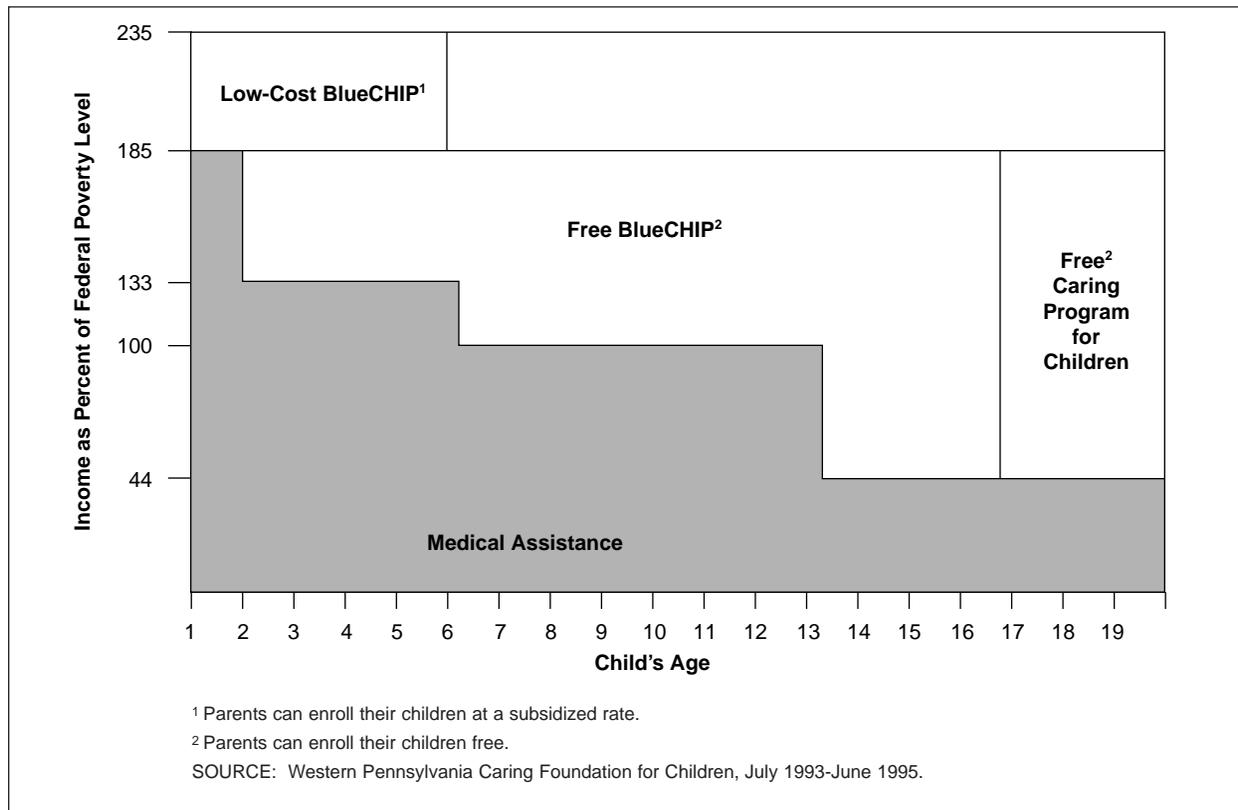
During the time period under study, the majority of the children were enrolled in an indemnity plan. However, towards the end of the study period, a number of children were enrolled in Keystone, which is a health maintenance organization. Under this plan, primary care physicians were paid a capitated rate but all other services were reimbursed on a fee-for-service (FFS) basis.

STUDY ISSUES AND HYPOTHESES

The first issue that we examined was the length of time that the children stayed in the program and the factors that influenced it. Children who disenrolled from the programs could have become covered under private insurance, become uninsured or enrolled in the Medicaid program (because the family's income dropped or because they "spent down" to Medicaid as a result of an expensive hospitalization). Because this study was based on analyses

² The low-cost Caring Program did not begin until June 1996, thus our data only included low-cost BlueCHIP for children up to 6 years of age.

Figure 1
Eligibility Guidelines for Medicaid, BlueCHIP, and Caring Programs: by
Family Income and Child's Age



of administrative data, we did not know what actually happened to the children who disenrolled. However, we found in an earlier study of a cohort of new enrollees (Lave et al., 1998) that, of the children who left the programs, more were covered by private insurance than by Medicaid. Based on this finding, we hypothesized that those family characteristics, such as parents being married or living in an urban area—which are most likely to be associated with getting private insurance—would influence duration of enrollment. Furthermore, we hypothesized that the child's sex would not be related to duration of enrollment, but that child's age would be because the child could age out of the programs. We also hypothesized that children who were in the low-cost programs would stay for a shorter period of time than those whose coverage was free.

The second issue we studied was the time pattern of payments. The null hypothesis was that there was some pent-up demand for services and that the use of health care services would be higher in the initial month(s) than in the later months of enrollment. We expected that the time path for utilization would depend on the type of service; for example, we expected that there would be some pent-up demand for dental services but none for emergency department services. Finally, we expected that there would be some differences in the time path of the use of services between the children enrolled in the free and low-cost programs; however, the direction of the difference was not clear a priori. Since the family incomes of the children enrolled in the low-cost programs were higher than those of children enrolled in

the free programs, the children could use more services when they are uninsured and therefore the pent-up demand would be lower. However, parents may delay getting coverage until the children actually need services; in that case, we expected the use of services on enrollment to be higher.

DATA

Information on the children who were enrolled in these insurance programs during the period July 1993 to June 1995 was obtained from the Western Pennsylvania Caring Foundation and Highmark Blue Cross and Blue Shield. The data used in the study were constructed from three different data bases: (1) an enrollment file that contained demographic information on all children who applied for the programs; (2) a file which contained monthly enrollment status data on children who were enrolled in the programs; and (3) claims data.

Study Population

The enrollment file contained demographic information on all children ($n = 83,434$) who applied for the programs regardless of whether they met the eligibility criteria. Then, we excluded children who did not have a subscriber ID ($n = 26,365$),³ children who did not have a date of birth or whose date of birth exceeds the eligibility age ($n = 2,758$) and duplicated entries ($n = 173$). Finally, we merged the demographic information from the enrollment file with the children found on the monthly enrollment status files. We had a study population of 34,694 children.

³ We do not know why these children were not enrolled in the program; it is likely that they did not meet the eligibility criteria. It is possible that some withdrew prior to completing the application process.

Claims Data

There were four different sources for the claims data: (1) facility claims for children enrolled in both the indemnity and Keystone plans ($n = 202,558$); (2) indemnity professional claims ($n = 236,730$); (3) Keystone professional claims ($n = 23,614$); and (4) Keystone professional encounter claims ($n = 39,027$). (The encounter level claims, which were those submitted by primary care physicians who were paid on a capitated basis, also contained a proxy reimbursement amount for each encounter.) Claims that did not have a subscriber ID or that did not have a subscriber ID matching one in our enrollment data base were excluded. In addition, claims that tracked the same transaction (i.e., correction of original claims, modification of payments, etc.) were accounted for. This left 322,733 claims.

The claims data were then categorized by type of claim. Using the Inter-Plan Data Reporting (IPDR) codes (the data coding system used by the Highmark Blue Cross and Blue Shield), the claims were first categorized by the type of claim (inpatient, outpatient, and professional) being reported. Furthermore, using the Physician's Current Procedure Terminology (CPT-4) codes, the claims were then categorized into different services covered by the programs: immunization, physician preventive care, physician non-preventive care, inpatient care, emergency department visits, dental preventive care, dental non-preventive care, vision care, hearing care, and prescription drugs. All claims data were linked and aggregated from the claim level to the person level. The payment information that we use from the claims data was either the payment actually made or a surrogate amount appearing on the encounter form.

Variable Definition

Socio-Demographic Information

We obtained data on age, race, sex, marital status of parents, number of children, and ZIP code of family residence from the enrollment file. In the analyses, race was defined as white and non-white, and age less than 1 year was set equal to 0.5. The marital status of the parents was classified into married and non-married. Most families had two or three children and so we classified the families into those with at least three children and those with fewer than three children. Finally, we classified each family as rural or urban based on the ZIP codes in which they lived, using a county classification developed by the U.S. Department of Agriculture (Butler and Beale, 1994).

Payment Group

We categorized children into a “free group” and a “partially low-cost group.” Most children were enrolled in the free programs during the study period. We found that no children were enrolled only in the low-cost programs; thus the children classified as “partially low-cost” were covered in both the low-cost programs and in the free programs (but not simultaneously).

An Episode

An episode of coverage was defined as a period when a child was continuously enrolled in the programs. In creating episodes we found that the monthly enrollment data sometimes indicated that children had short gaps in coverage. Therefore, we defined an episode as a period in which a child did not have a break in coverage of more than 3 months. (This decision was made after consultation with

the Caring staff who believed that breaks of less than 3 months were probably data errors.)

Use of Services and Average Payment in an Enrollment Month

The purpose of this analysis was to determine the pattern of use of services over time after enrolling in a health insurance program. Therefore, we excluded all children who were enrolled as of July 1993 ($n = 5,161$) because we could not observe their use of services during their first month of coverage (Swartz, Marcotte, and McBride, 1993a). Next, we determined the proportion of children who used services (in the aggregate and by type of service), the average payment for those services and the average payment per child who used services for each month the child was enrolled in the program. The j^{th} enrollment month was defined as the j^{th} month from the first month the child was initially enrolled. We had a potential of 23 enrollment months. However, we only presented payment data for enrollment months in which there were at least 1,000 covered children in the free programs or 100 covered children in the partially low-cost group.⁴ Furthermore, we only examined the data for the first episode of coverage.

Payment Per Coverage Year

We determined the annual payments made for children who were continuously enrolled in the programs for at least 1 year. We calculated the calendar year payments for children who were continuously enrolled between January 1, 1994 and December 31, 1994 (regardless of when they originally enrolled in the programs).

⁴Very few children were categorized as low-cost. Since this is a group in which there is considerable policy interest, we were much less conservative in setting the cut-off number.

We also calculated the annual payments for children who were enrolled February through July 1994 if they stayed in the programs for a full year. Of the 34,694 children, 15,730 children were continuously enrolled in the programs for 1 year for the previously mentioned time periods.

METHODS

We used survival analysis to estimate the effects of children/family characteristics on enrollment duration as measured in months. Although we knew the date a child enrolled in the programs, we did not know when each child disenrolled from the program, since we only followed the children through June 1995. Therefore, the data were right-censored. Estimates of average enrollment duration are biased if censored data are dropped. Survival analysis is an efficient method of handling right-hand censoring (Luke, 1993; Swartz, 1993b).

We used the Cox semiparametric proportional hazards model (Cox, 1972, 1975) to assess the factors influencing a child's duration in the program. The primary strength of the proportional hazards model is that it makes no assumptions about the form of the hazard function over time (Cantor, 1997). We assumed that the enrollment duration of each child follow its own hazard function $h(t, \underline{x})$, expressed as

$$h(t, \underline{x}) = h_0(t) \exp(\beta' \underline{x})$$

where h_0 is a baseline hazard function, \underline{x} is the vector of child/family characteristics for each child, and β' is the vector of parameters associated with the explanatory variables. The estimates of the hazard model can be used to determine how various factors associated with an enrollment affect the hazard rate from the CHIPs. If β' is positive, then the hazard rate increases

as x increases. That is, a child would be more likely to exit the programs as x increases. We only examined duration in the first episode. We estimated survival functions for the full population as well as for the free group and the partially low-cost group separately.

The Wald chi-square test (Cox, 1972) was used to test the effect of each explanatory variable on the duration of enrollment. The Z test (Moore, 1995) was used to compare the differences in the proportions of free and enrolled children who used services. In addition, the t test (Moore, 1995) was used to compare the differences in the average payment between free and low-cost programs. Finally, we present the graphs of the time pattern of payment per enrollee for each service with respect to enrollment month.

RESULTS

Sample Characteristics

Table 1 presents information on the sociodemographic information on the children. It will be observed that the overwhelming majority (about 98 percent) of the children were covered under the free programs. The children enrolled in the free programs were different from those enrolled in the low-cost programs with respect to duration of enrollment, age, race, parental marital status, and the number of children in the family ($p < .05$).

Survival Analyses

There are 34,694 children in this analysis. Approximately 97 percent of the children had only one episode of coverage. About 75 percent of the study population had right-censored enrollment. The observed median duration of the first episode was 11 months for total group, 6

Table 1
Variable Definition and Descriptive Statistics

Variable	Free Group <i>n</i> = 33,934			Partially Low-Cost Group <i>n</i> = 760			Total Group <i>n</i> = 34,694		
	Mean	SD	Percent	Mean	SD	Percent	Mean	SD	Percent
Dependent Variable									
Duration (Months)	10.6*	6.5	—	8.2	5.8	—	10.6	6.5	—
Independent Variables									
Child Characteristics									
Age	10.4*	4.4	—	2.4	1.6	—	10.2	4.6	—
Male	—	—	51.4	—	—	53.9	—	—	52.0
Non-White	—	—	5.6**	—	—	3.0	—	—	5.5
Free Group	—	—	—	—	—	—	—	—	97.8
Family Characteristics									
Non-Married	—	—	29.6*	—	—	20.1	—	—	29.4
Kids ≥ 3	—	—	36.3*	—	—	10.8	—	—	35.7
Urban	—	—	72.3	—	—	74.5	—	—	72.0

* Statistically significant at 1 percent level.

** Statistically significant at 5 percent level.

NOTE: SD is standard deviation.

SOURCE: Western Pennsylvania Caring Foundation for Children, July 1993-June 1995.

months for the partially low-cost group, and 11 months for the free group. The estimated median duration of enrollment is similar: 11 months for the total group, 5.5 months for the partially low-cost group, and 11.5 months for the free group.

Table 2 presents the estimated results of the survival analysis using the proportional hazards model.⁵ Looking at the results for the model including all children, as hypothesized, the children enrolled in the free programs stayed in the programs longer than those enrolled in the low-cost programs. In fact, enrollment in the free programs (relative to the low-cost programs) was the most significant factor influencing duration in the programs. Overall, the older children were more likely than younger children to leave the programs. Non-white children stayed longer than the white children, but the coefficient was statistically insignificant. Since about

95 percent of the study sample was white, it was difficult to measure the effect of race on the enrollment path. Children with non-married parents stayed in the programs longer than children with married parents. Children who lived in the urban areas stayed longer than those who lived in the rural areas, a finding somewhat unexpected. However, with the exception of type of program, the sizes of estimated effect were very small for all significant variables.

The results for the model including the free group only were similar to those for the total group, which is not surprising since the free group make up 98 percent of all children. No demographic characteristics were found to influence duration of the partially low-cost group.

Enrollment Month Analysis

Table 3 provides information on the utilization and payment of services for the 20 enrollment months. The percent of enrollees in the partially low-cost group varied between 1 percent and 3.6 percent.

⁵ The proportional assumptions of Cox's model are tested from the plot of $\log(-\log(S(t)))$ vs. $\log(\text{duration})$, where $S(t)$ is the probability of staying on the programs. The results indicate that the assumptions of the Cox model are appropriate.

Table 2
Effects of Children/Family Characteristics on Duration (Months) of Enrollment

Variable	Free Group		Partially Low-Cost Group		Total Group	
	Parameter Estimate	Risk Ratio	Parameter Estimate	Risk Ratio	Parameter Estimate	Risk Ratio
Age	0.003151** (0.00144)	1.003	0.038931 (0.02469)	1.040	0.003352** (0.00144)	1.003
Male	-0.010412 (0.01207)	0.990	-0.021124 (0.07665)	0.979	-0.010496 (0.01192)	0.990
Non-White	-0.017527 (0.02854)	0.983	-0.152924 (0.02833)	0.858	-0.020114	0.980
Free Group	—	—	—	—	-0.408265* (0.04035)	0.665
Non-Married	-0.032659** (0.01387)	0.968	0.026274 (0.09504)	1.027	-0.030846** (0.01372)	0.970
Kids ≥ 3	0.002312 (0.01273)	1.002	-0.010686 (0.01266)	0.989	0.001933	1.002
Urban	-0.030691** (0.01343)	0.970	-0.035071 (0.08812)	0.966	0.030426** (0.01328)	0.970

*Statistically significant at 1 percent level.

**Statistically significant at 5 percent level.

NOTE: Standard errors are listed in parentheses.

SOURCE: Western Pennsylvania Caring Foundation for Children, July 1993-June 1995.

Utilization Rates

Overall, the utilization rates (the proportion of children who received at least one service of any type [Table 3]) were highest during the second enrollment month and next highest during the third enrollment month. The utilization rates were higher in each of the first 4 months of coverage than during any subsequent enrollment month. The utilization rates for the partially low-cost group were higher than for the free group in 13 out of 14 months for which we present comparable data; in 12 of the 14 months the utilization rates were significantly higher.

Average Payment per Enrollee

For all the children as well as for each of the two subgroups, the average payment per enrolled child was highest during the second enrollment month. The payment

pattern was similar to that for utilization rates. For the full group and for the free group, the average payments were higher during each of the first 4 months of coverage than any other subsequent month (with the exception of the 20th month). The average payments for the partially low-cost children were higher than that for the free children in 10 out of 13 coverage months for which we present data—in 4 of those 10 months, the payments are significantly higher ($p < .05$).

Average Payments per User

The most important force driving the system was the number of children using the covered services. However, in addition to the average payment per enrollee, we examined the average payment per user as well. The average payment per child who used services was at least twofold higher than the average payment per enrollee.

Table 3
Average Payment for All Services by Enrollment Month for Blue CHIP/Caring Enrollees

Enrollment Month	Free Group										Partially Low-Cost Group										Total	
	Percent of Enrollees in Free Group					Average Payment Per Enrollee					Percent of Recipients					Average Payment Per Enrollee					Average Payment Per User	
	Total Number of Enrollees	Percent of Enrollees in Free Group	Percent of Recipients	Average Payment Per Enrollee	SD	Percent of Recipients	Average Payment Per Enrollee	SD	Percent of Recipients	Average Payment Per Enrollee	SD	Percent of Recipients	Average Payment Per Enrollee	SD	Percent of Recipients	Average Payment Per Enrollee	SD	Average Payment Per User	SD			
1	29,533	97.6	36*	45.76*	160.13	127.31	246.88	50	67.46	227.21	134.36	306.57	36	46.29	162.06	127.54	249.02					
2	28,476	97.6	42*	54.63*	185.53	129.00*	267.75	49	83.89	274.38	169.49	371.29	43	55.34	188.20	130.14	271.25					
3	26,821	97.7	39*	48.87	180.42	124.81	271.39	46	51.17	185.26	112.36	262.00	39	48.93	180.53	124.48	271.15					
4	24,810	97.8	35**	43.91	172.94	123.76	272.78	39	48.82	204.54	126.04	314.03	36	44.02	173.68	123.81	273.81					
5	23,789	98.1	34*	40.39**	154.34	118.27***	246.06	44	61.65	236.95	140.48	342.41	34	40.80	156.35	118.82	248.84					
6	22,094	98.3	31*	36.60***	167.89	117.06	284.16	41	47.39	157.06	115.06	228.78	31	36.79	167.70	117.01	282.98					
7	20,278	98.5	32*	37.82***	167.77	118.10	280.04	44	57.68	229.49	132.57	334.17	32	38.12	168.88	118.40	281.22					
8	19,355	98.5	35**	41.1	195.38	118.83	317.99	40	35.21	166.74	87.42	254.63	35	41.02	194.99	118.30	317.03					
9	17,827	98.7	34*	38.42	163.17	113.72	265.04	43	54.09	213.65	126.98	313.99	34	38.61	163.89	113.93	265.85					
10	16,661	98.8	33**	38.64**	163.69	118.54**	269.70	42	75.34	288.83	179.52	426.16	33	39.06	165.71	119.44	272.71					
11	15,262	98.8	32	41.84	323.05	132.21	563.82	36	39.08	169.23	109.31	270.71	32	41.81	321.67	131.91	560.93					
12	13,987	99.0	31***	38.57	178.38	125.46	304.31	36	43.28	118.45	120.67	174.19	31	38.62	177.86	125.40	303.06					
13	12,395	99.0	33*	43.71	284.28	132.35	482.71	46	37.10	71.55	80.96	88.09	33	43.65	282.99	131.66	479.61					
14	10,966	99.0	34	41.82	208.25	123.75	343.84	1.0	43.33	208.51	137.63	357.93	34	41.83	208.25	123.88	343.93					
15	9,196	99.0	34	41.13	215.17	120.52	355.16	—	—	—	—	—	34	41.20	214.81	120.86	354.62					
16	6,311	98.0	33	40.29	182.75	121.31	301.25	—	—	—	—	—	33	40.06	181.69	120.45	299.34					
17	5,699	98.9	34	39.54	153.17	116.48	245.30	—	—	—	—	—	34	39.42	152.42	115.94	243.86					
18	4,748	98.9	32	35.61	135.54	110.49	220.82	—	—	—	—	—	32	35.71	135.71	110.54	220.82					
19	1,564	97.3	34	37.78	157.06	110.36	253.28	—	—	—	—	—	35	38.02	155.18	109.52	248.23					
20	1,062	96.4	34	45.19	180.06	132.23	289.03	—	—	—	—	—	35	44.40	176.98	129.49	282.85					

*Statistically significant at 1 percent level.

**Statistically significant at 5 percent level.

***Statistically significant at 10 percent level.

NOTE: SD is standard deviation.

SOURCE: Western Pennsylvania Caring Foundation for Children, July 1993-June 1995.

For the first 9 enrollment months, the average payment per user was highest during the second enrollment month. The average payment of second enrollment month for the partially low-cost group was significantly higher than that of free group ($p < .01$). However, the payment pattern per user was not similar to that for the enrollees. The distribution of average payment per user was much more irregular.

Time Pattern of Use of Services and Average Payment

Figures 2 through 7 present the pattern of average payment per enrollee by enrollment month for different types of health care services for all children combined.⁶ There were differences in the payment pattern across the different services. For most services, the highest average payment per enrolled child occurred in the second enrollment month.

Figure 2 shows average payments for physician services. Children had the highest average payment in the second enrollment month. For both preventive and non-preventive dental care (Figure 3), the highest average payment occurred in the second enrollment month. The average payment for dental services then peaks every 6 months (a pattern consistent with the 6-month regular check up schedule for children). For vision care (Figure 4), the highest average payment appeared in the second enrollment month. The average payment then decreased, but peaked again after 1 year of enrollment. This was consistent with the 12-month regular checkup schedule for vision care. The average pay-

⁶ We do not present separate data on the free and low-cost children because (a) the overall results are determined by the free children since they make up 98 percent of the sample, and (b) the partially low-cost group was different from the free group in ways that would make service by service comparisons meaningless. For example, the partially low-cost group was much younger than the free group, and therefore they would not be expected to be heavy users of vision, dental, or hearing services.

ments for outpatient prescription drugs (Figure 5) and emergency room visits (Figure 6) were not related to the enrollment month. Hospitalizations had a similar pattern to emergency room visits. For hearing care (Figure 7), few children had the service and the average payment did not show any regular pattern.

Annual Payment of the Programs

The data previously discussed suggest that the costs of covering children under programs will depend to some extent on the distribution of children by length of time in the programs. We found that average payment for a continuously enrolled child was \$501. However, if we assumed that the programs consisted of children who were enrolled for 3 months only, then the estimated average annual payment of such a program would be \$602. The average payment of \$501 was an observed mean of the coverage year payments, while the average payment of \$602 was estimated from the sum of average payment per enrollees in the first 3 enrollment months and multiplied by 4 quarters (Table 3).

DISCUSSION

In this article, we examine the utilization experience of children who were enrolled in programs designed to cover uninsured children. The Caring Foundation estimates that these programs covered about 70 percent of the eligible children in families with incomes below 185 percent of the FPL in Western Pennsylvania. These children were enrolled in the free programs. However, only a small number of children were enrolled in the low-cost programs and it seems likely that a high proportion of eligible children did not enroll.⁷ A previous

⁷ We cannot determine the actual enrollment rates for the low-cost groups since reliable data on the eligible population are not available.

Figure 2
Average Payment for Physician Services, by Enrollment Month

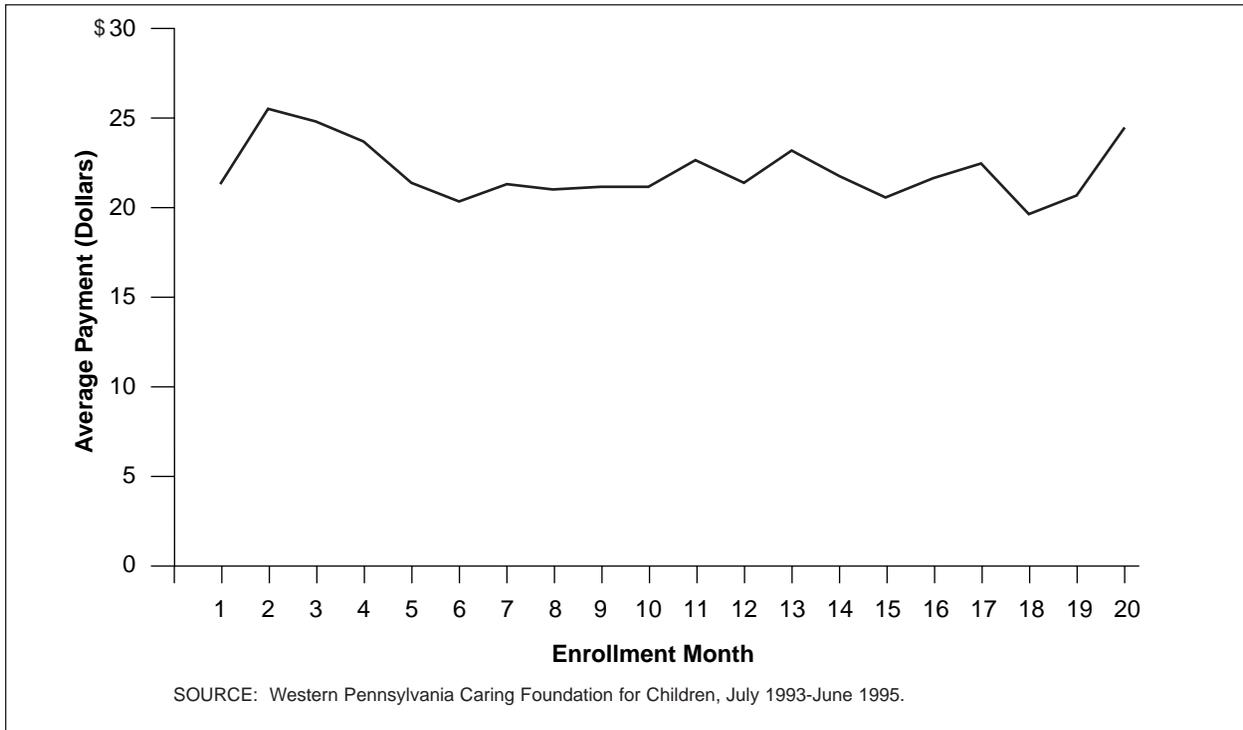


Figure 3
Average Payment for Dental Care, by Enrollment Month

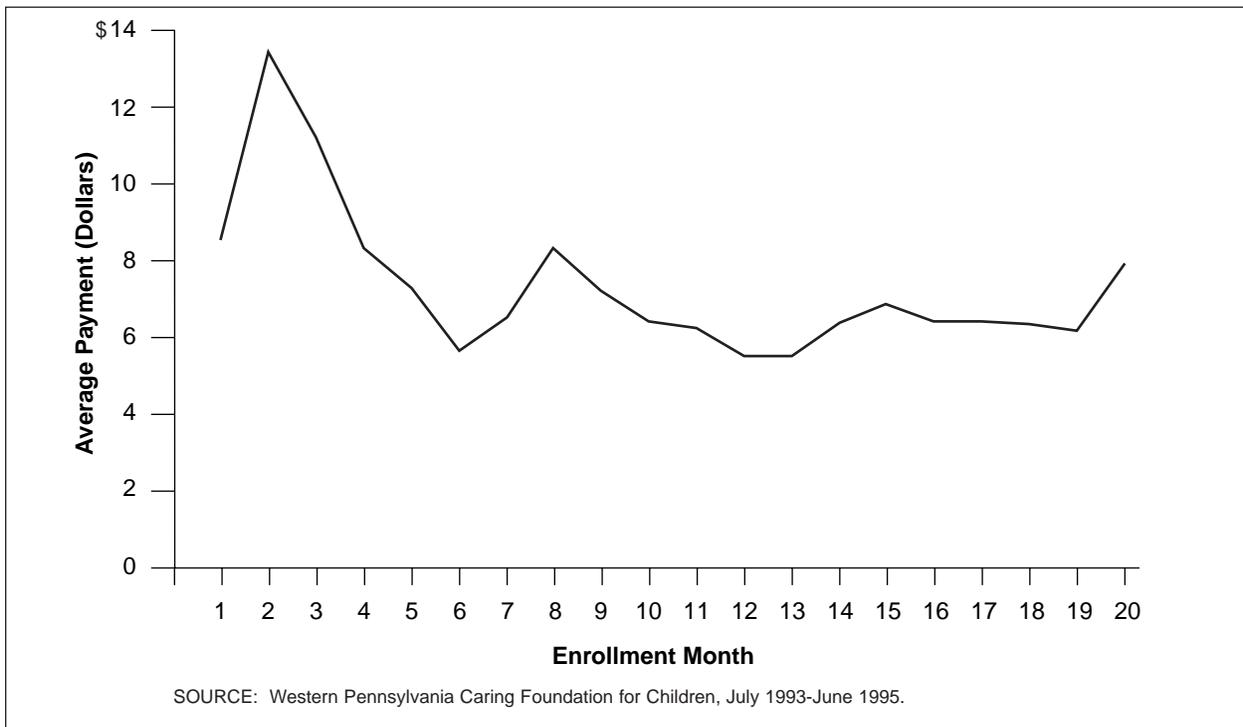


Figure 4
Average Payment for Vision Care, by Enrollment Month

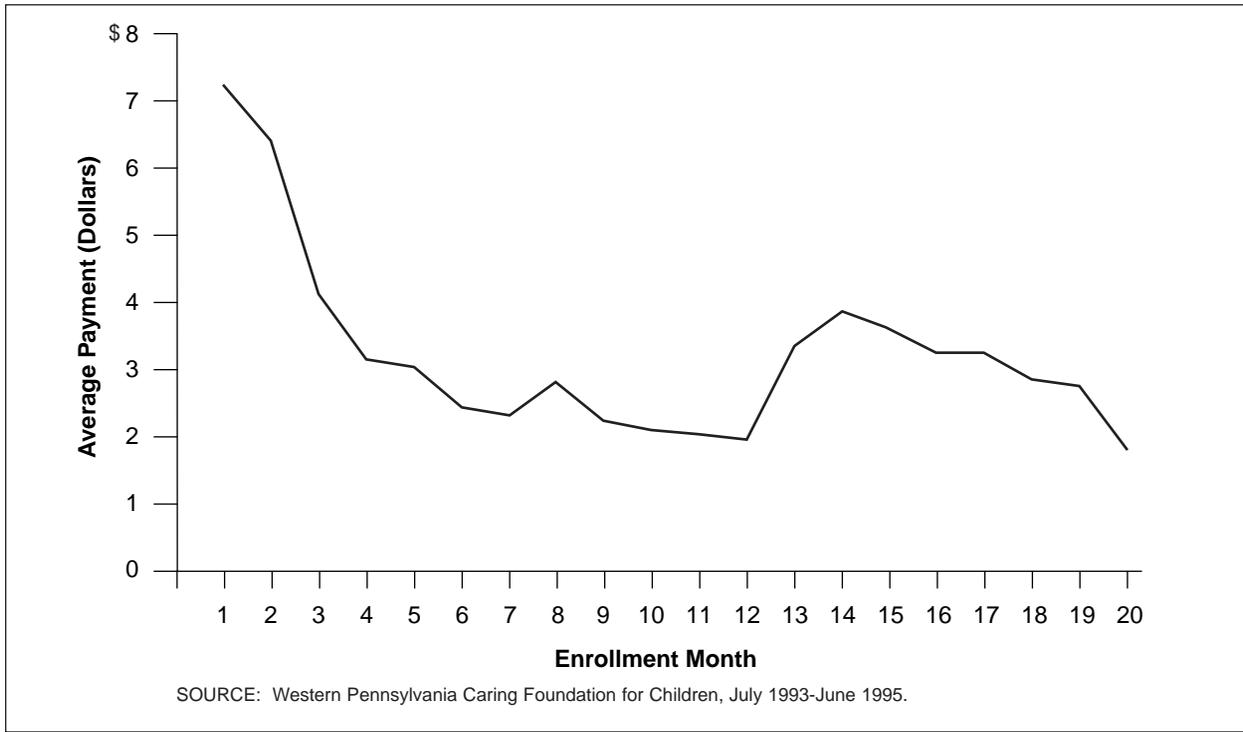


Figure 5
Average Payment for Prescription Drugs, by Enrollment Month

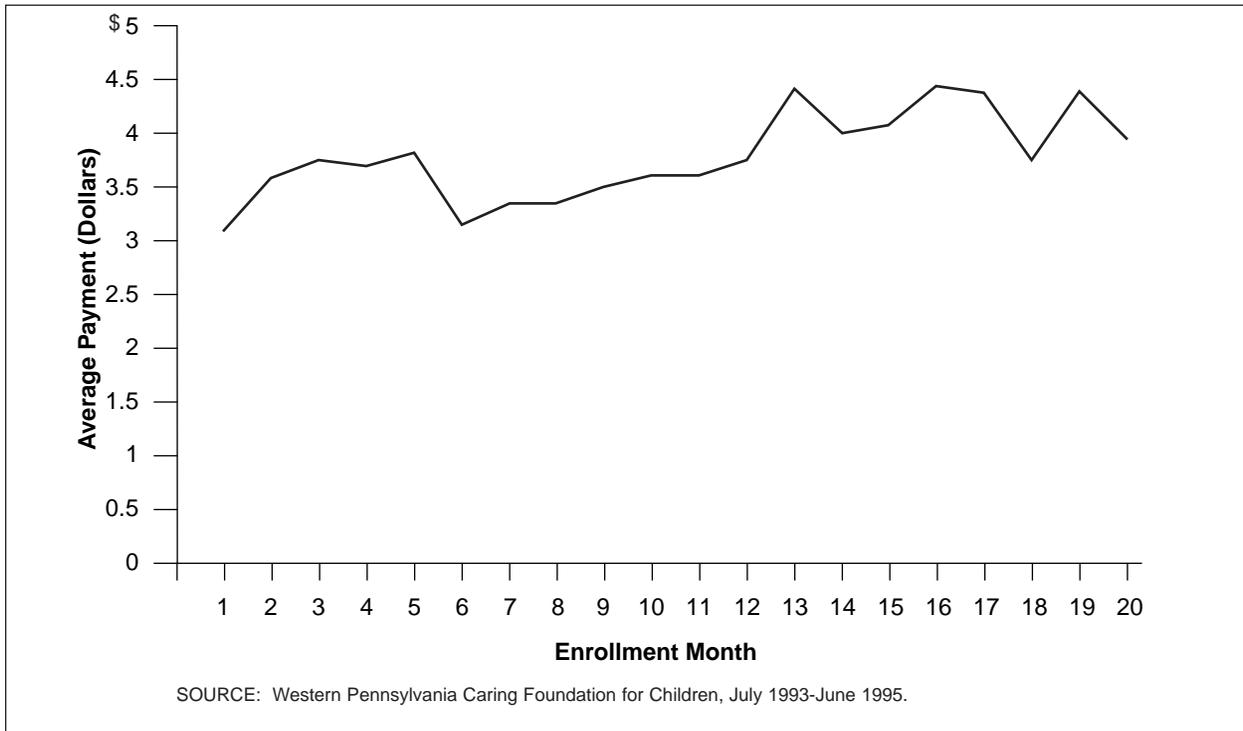


Figure 6
Average Payment for Emergency Department, by Enrollment Month

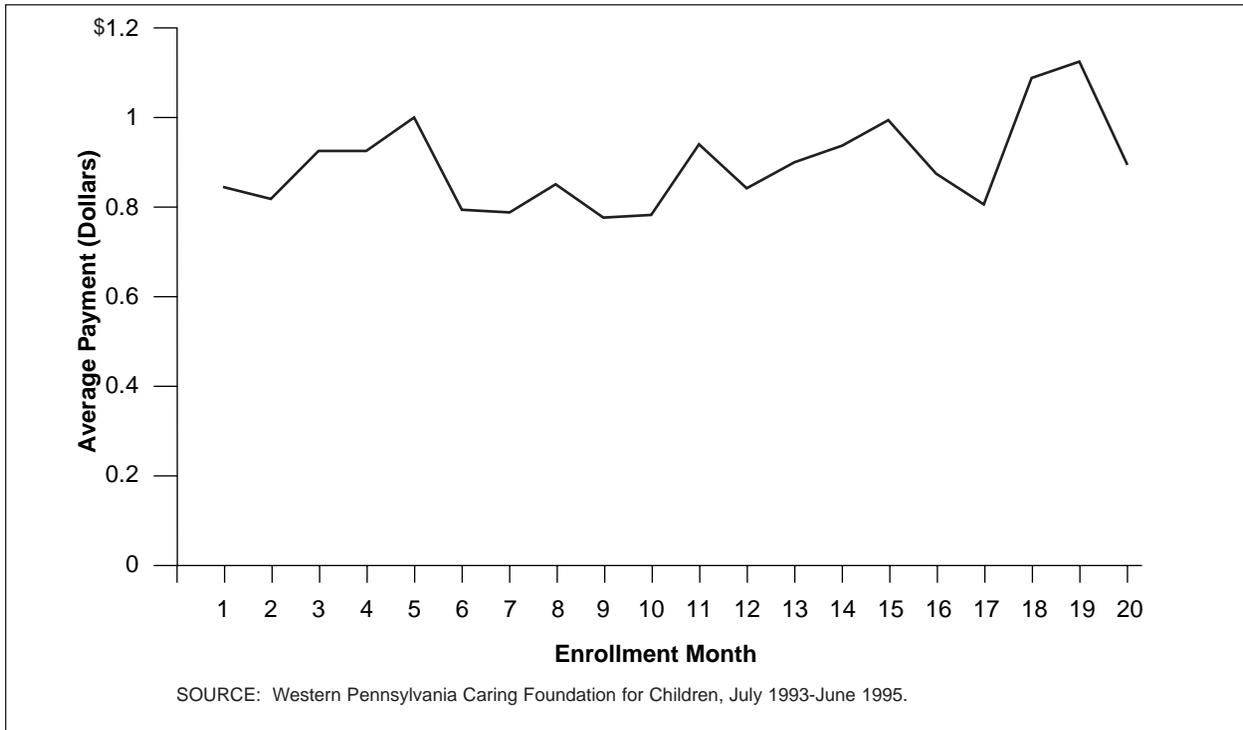
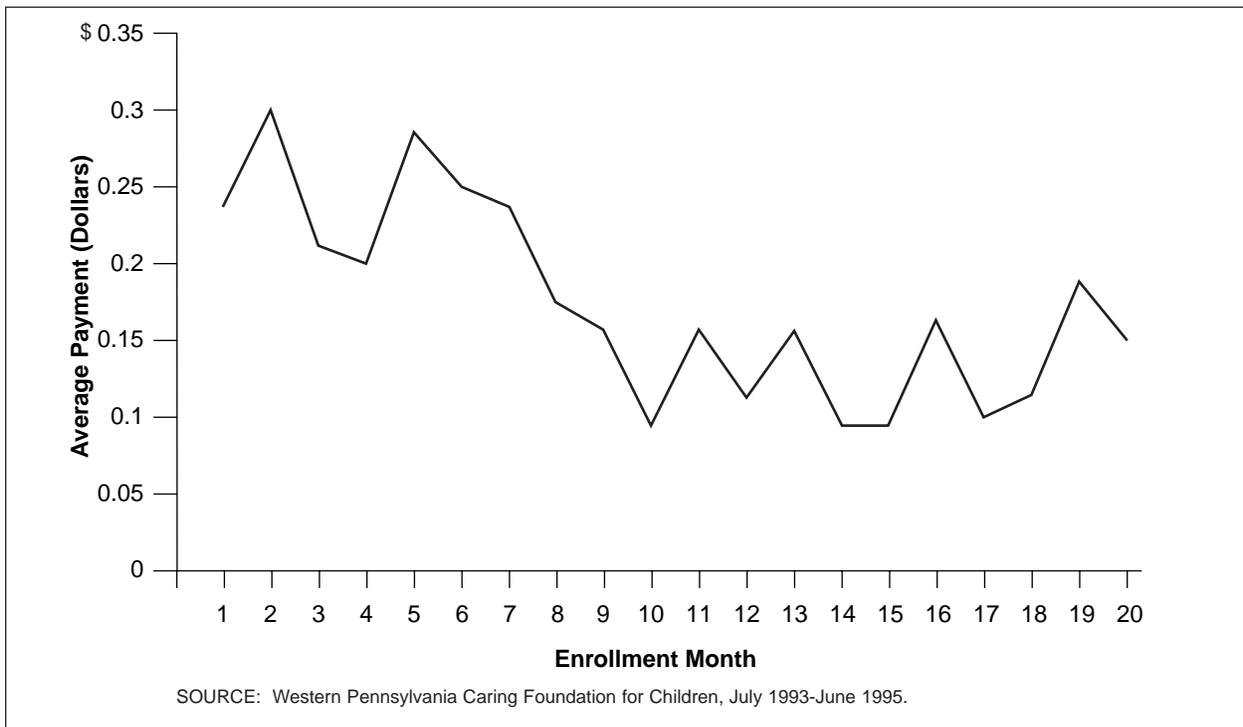


Figure 7
Average Payment for Hearing Care, by Enrollment Month



study found that a premium of \$17 per month caused a decrease in the participation of uninsured children in a CHIP by 24 to 38 percent (Kaiser Family Foundation, 1998). In Western Pennsylvania, the monthly premium for the low-cost programs was \$20 per child. Thus, the monthly premium might have contributed to the low participation rate in the low-cost programs.

The data from the children's health care programs in Western Pennsylvania indicated that there was considerable amount of turnover among the children who were enrolled in these programs. We found that the children who were covered in the low-cost programs stayed the shortest period of time. There are several possible reasons for this. First, the parents could have enrolled the children to get medical care, and then disenrolled once their medical needs were met. Second, these parents could have been more likely to obtain private sector coverage than the parents of children enrolled in the free programs. Finally, the children could age out of the low-cost programs at age 6.

Unfortunately, we do not know what happened to the children who disenrolled from the programs since these outcomes are not maintained in the programs' administrative records. We believe that a majority of the children leaving the programs, particularly the free program, obtained private health insurance. This belief is based on the findings from a study of children who enrolled in the programs between August 1994 and December 1995. We found that, 1 year after enrollment, 61 percent of the children were still enrolled in the programs, 13 percent were covered in private plans, 6 percent in Medicaid plans, 5 percent were uninsured and 15 percent were lost to followup (Lave et al., 1998).

The pattern of use following enrollment suggests that there is significant pent-up

demand for services. We found that the overall utilization rates were highest in the first 4 months of coverage. However, these high utilization rates were determined primarily by the high utilization rates for both physician and dental services—the types of services for which one would expect pent-up demand. In the study of new enrollees previously discussed, we found that children who had been uninsured for a longer period of time accounted for much of the increase in utilization observed in the first month of coverage (Lave et al., 1998). Together these findings indicate that the cost of a CHIP will vary with the nature of enrollment into the programs. The cost of a program that enrolls children who have been uninsured for a long period of time will be higher than one where the enrollees are primarily “stayers” or children who enroll quickly after losing private health insurance. As discussed earlier, we estimated that the per enrollee payment of a program that turned over its enrollee population every 3 months would be about 20 percent higher than one that served continuously enrolled children.

The health care programs analyzed in this article were very comprehensive. The programs covered not only hospital and physician services, but also drugs, dental, vision, and hearing services—the so-called optional services. We estimated that the annual payments for a continuously-enrolled child was about \$500 in 1994 and simulated payments of about \$600 per child if there was a significant turnover in the programs. The cost of the optional services was relatively cheap, particularly for vision and hearing services. This finding is consistent with that of Martin et al. (1997), who looked at the use of services of newly enrolled families in a health plan designed for low-income families in Washington State. However, it must be pointed out that these payment estimates were biased

downwards because some children disenrolled from the programs—not because their family circumstances changed—but because they had high medical expenditures. Under an arrangement with the Commonwealth, the programs' funds counted towards the parents' spend-down requirement; therefore, if there was a very long or expensive hospitalization some of the expenses would have been picked up by Medicaid. These children then would have been shifted to the Medicaid program and the subsequent costs of medical services picked up by Medicaid. We did not have any information on how many children switched to the Medicaid program for this reason. Furthermore, since disabled children were covered under the Supplemental Security Income program, they would not have been enrolled in the CHIPs.

This study has some limitations. The major limitation is that it focuses on children who were voluntarily enrolled in the CHIPs in a small geographic area of the country. However, these children were similar to the types of children who would be insured under the CHIP. They came primarily from families with incomes between 100 and 185 percent of the FPL. We also know from our other work, that they came primarily from families in which one or both parents are employed (Lave et al., 1998). Therefore, we believe that the nature of our findings should be generalizable to other States' CHIPs. The second limitation is that the data were based on administrative records; therefore, the validity of our estimates depends on the underlying validity of the claims data. While the total payments made under indemnity programs are likely to be accurate, it is possible that allocation of payments across the different types of services may have some problems because of errors in coding. Furthermore, it is possible that the simulated payments for ser-

vices provided by the capitated physicians are underestimated. Since the primary care physicians do not have to submit the encounter payments in order to get paid, they may not submit an encounter form for each visit. This would lead to an underestimate of the payments for physician visits and for total expenditures. The third limitation is that eligibility for the low-cost program was restricted during the study period, so the conclusions about partially low-cost group should be interpreted cautiously. Nevertheless we believe that the general nature of our conclusions with respect to the pattern of use is sound.

Pennsylvania's BlueCHIP/Caring Programs have become a nationally recognized and studied model of CHIPs. This study of BlueCHIP/Caring Programs should provide timely and useful information for State policy deliberations concerning the structure and funding for new CHIPs being created under CHIP legislation.

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